V. 13 #8

The MONTHLY REVIEW

Published Monthly by the

American Electroplaters Society

A SOCIETY FOR THE ADVANCEMENT

OF THE

SCIENCE OF ELECTROPLATING

AUGUST, 1926

Entry as second-class matter, applied for at the Post Office at Chicago, Ill., under the Act of August 24, 1912.

Acceptance for mailing at special rate of postage, provided for in section 1103, Act of October 3, 1917, authorized September 26, 1922.

PRESSGE-HOOKER
WAYNE
UNIVERSITY
SCIENTIFIC LIBRARY

EXECUTIVE BOARD OFFICERS, A. E. S., 1926-1927

President
F. C. Mesle, Box 465, Sherrill, N. Y.
First Vice-President
Robert Steuernagel, 1508 Concordia Ave., Milwaukee, Wis.
Second Vice-President
John H. Feeley, 411 Aylmer St., Montreal, Quebec, Canada
Secretary-Treasurer
George Gehling, 5001 Edmund St., Philadelphia, Pa.
Past President
E. J. Musick, 7144 Kingsbury Boul., St. Louis, Mo.

Editor
F. J. Hanlon, 3040 Diversey Ave., Chicago, Ill.
Associate Editors
Dr. Wm. Blum, Bureau of Standards, Washington, D. C.
B. F. Lewis, 10398 American Ave., Detroit, Mich.
O. E. Servis, 5305 Warner Ave., Chicago, Ill.
E. W. Heil, Wichita, Kans.
W. S. Barrows, 628 Dovercourt Rd., Toronto, Canada

Publishing Committee
George B. Hogaboom, 269 Oliver St., Newark, N. J.
O. J. Sizelove, 919 Chancelor Ave., Irvington, N. J.
Walter Fraine, 507 Grand Ave., Dayton, Ohio

Research Committee, 1926-1927

R. J. O'Connor, 1128 Noble Ave.,	Bridgeport, Conn.
W. M. Phillips	Birmingham, Mich.
Walter Fraine	Dayton, Ohio
O. E. Servis	Chicago, Ill.
Philip Sieverling, 54 Nairn Place,	Newark, N. J.

Award Committee on Papers, 1926-1927

Dr. Wm. Blum	Washington, D. C.
W. S. Scott	Philadelphia Branch
Wm. DeLage	Waterbury Branch
W. S. Barrows	Toronto Branch
F. J. Hanlon	Chicago Branch

NOTICE—BRANCHES

The Review closes forms on 20th of the month. Kindly have your publication matter here on that date or it will not be in the current issue. Editor.

EXHIBIT PRIZE AWARDS

First Prize—George J. Belle Bridgeport, Conn.

Second Prize—Milwaukee Branch, Mr. Goodsell and Mr. Gross.

Third Prize—Geo. Lankemeyer St. Louis Branch.

MONTHLY REVIEW

Published by the

American Electroplaters Society

Publication and Editorial Office
3040 Diversey Ave., Chicago

VOL. XIII AUGUST, 1926 No. 8

EDITORIAL

A small group or clique of biased old school platers, about to knock asunder everything that is for progress of our industry, is the mental picture of the supreme society executives, held by many of our members who unfortunately never have had the opportunity to attend a convention.

Nothing could be further from the truth. You, my dear members, whose eyes are perusing this editorial are the supreme society of the American Electro Platers Society. Supreme officers are your servants and not your masters and the choice of your majority of delegates at these annual elections.

There are 22 branches in our society who each year elect 3 delegates to our annual meeting and as planned by the wise organizers of this society that irregardless of numbers each branch large or small would be equally represented. And the whole society function in a uniform manner.

When you elect or select a delegate from your branch he is your representative, he votes for you and carries your thoughts to this meeting; thus you are personally and definitely responsible for the laws, levies upon yourself and fellow branches and members.

Once in a while you are a bit careless in the selection of your representative. Now and then a delegate is sent by some branch, who does not understand the customs of these meetings, or one whose only interest lies in the pleasures of the ride and is a good fellow; but this in no way effects the results. Such misrepresentatives seldom sit in the educa-

tional sessions, but stray off at random and return home with a hazy report of just what has happened, other than it was a swell convention.

But out of the group of men classed as the clique and your supreme officials; a self-sacrificing group of men come many of the good things that go to perpetuate and establish a prestige for your society and its fundamentals. The supreme society of the American Electro Platers needs no apologist. It is composed of handpicked foreman plater executives the finest men in our industry, whose courtesy and appreciation of the other fellow's genius has made its legislation painstaking and generous, and therefore asks your sincere co-operation and hearty support of its few rules and ideals. Give a little, take a little and always defend your society from unjust criticism of uninitiated.

H. J. RICHARDS, THE PLATER

A Plater has a problem, and he wants to have it solved,
It's a question about plating, with a lot of things involved.
He says, that if a nickel tank is loaded up with work
With conditions that are normal, and the dynamo don't shirk
Using two volts and a quarter, plate for half an hour the batch.
Now the question that this plater, has been mean enough to hatch
Is how much increased plating time, this work would take to do.
If instead of two and a quarter volts, we brought it down to two
To understand this thing correct, to start concise and formal
Define the plating methods which, may be described as normal,
And when this part is understood, explained and clearly stated
There ain't no doubt but what we'll get this thing elucidated,
And when we've thought the question through, from inside and from out,
The answer that we'll surely get will be without a doubt
As plain and bright as day from night, as clear as noonday sun,
The time it takes to plate this batch—Is just until it's done.

—H. J. RICHARDS.

FOUNDERS MEDAL

O. J. Sizelowe, Newark Branch.

MEMBERSHIP DRIVE

Chicago Branch—Loving Cup, First Prize.

ELECTRO DEPOSITION OF TIN

By Walter Fraine

The early textbooks on plating contain considerable information regarding tin plating, either by simple immersion, by boiling, by boiling in contact with zinc or by contact with grain tin or block tin, which are electrolytic in their action, although not commonly so called.

References abound, as can be noted by turning to Roseleur, Elsner, Maistasse, Fearn, Birgham, Fields, Watt, Brandt, and so on down to our good friends and associates Blum and Hogaboom, of solutions suitable for these methods and some recommended as well as for heavier coatings.

For many years most of the tin depositing was done either by the immersion or the contact method largely because the work could be done at a very low cost and in considerable bulk. These two methods, used on small work where appearance and not wear was the chief consideration, gave satisfactory results.

When, however, it became necessary to provide thicker coatings to secure greater protection and wear, it became necessary to turn to the electrolytic method, with current from an outside source in order to secure these results. While heavy tin coatings can be easily and rapidly deposited by this method from solutions of various formula, great care must be taken to have all the conditions within proper limits to secure satisfactory deposits at low labor cost. The current density especially must be closely regulated to prevent spongy deposits and treeing. To prevent this, unless additional agents are used, it is necessary to remove the work from the solution frequently for scratch brushing to lay the grain of the metal and to keep the deposit even. This puts a labor cost on tin depositing which is, in many cases, out of proportion to its value to industry.

Out of the number of solutions suitable for heavy deposits of tin, in the writer's opinion there are three which, from the factors of ease of management, thickness of deposit secured, quality of deposit and low labor cost, are to be preferred. These are the fluoborate or fluosilicate solution which is prepared by dissolving stannous chloride in caustic soda to form stannous hyroxide and to take up this precipitate with either of the desired acids—the stannous chloride, sodium hydroxide solution mentioned by Blum and Hogaboom with this formula:

Stannous chloride (Sn C12, 2 H2 O).....	4	oz.	per	gal.
Sodium hydroxide (Na O H).....	10	"	"	"
Glucose (dextrose, C6, H 12 O6).....	8	"	"	"
Water	1			"

and the sodium stannate solution:

Sodium stannate (Na2 Su O3).....	24	oz.	per	gal.
Stannous chloride (Sn C12, 2 H2 O).....	¼	"	"	"
Rosin 1/32		"	"	"
Water	1			"

The fluoborate solution gives a fine thin dense deposit and requires scratch brushing to build up heavier deposits; its cost and greater difficulty of preparation reduces its popularity as compared with the alkaline solutions.

Both the stannous chloride and hydroxide solution and the sodium stannate-stannous chloride solutions are capable of building up close grained, dense, impervious deposits, free from pin holes, to any thickness desired. Both solutions are long lived, constant in action, easy to control and remarkably free from sponginess or treeing at ordinary voltages.

The advantage, in our opinion, lies with the sodium stannate-chloride solution, in view of the fact that its period of usefulness is greater than the sodium hydroxide solution on account of the tendency of the hydroxide solution to accumulate sodium chloride which results in changing the color of the deposit from its original silver gray to a blue, and finally to a dark shade approaching black, which limits its usefulness. Both of these solutions deposit freely with a range of 140° to 180° F. Anodes:

Anodes used in the sodium stannate solution block tin and sheet steel, 90 per cent tin to 10 per cent steel. So far, it appears that the solution maintains itself from the anodes except for the amount carried out by the drag in removing the work. Replacements are made by adding sodium stannate in the original proportions and, if needed, muriate of tin:

Voltage: 5½ volts.

Amperes: 5 to 40 per sq. ft.

Thickness of deposit:

As mentioned above, either of the two alkaline solutions will give close grained, dense, smooth deposits to any desired thickness without any intermediate scratchbrushing.

Throwing power:

One of the points in favor of the stannate solution is its great throwing power; angles, depressions, cavities, tubing, even cylinders as long as 16″ × 5″ × 2¼″ are completely and evenly coated over the interior.

Additional agents:

Rosin dissolved in caustic soda (H. O. H), 1/32 oz. per gallon when solution is used continuously.

Starch dissolved in water.

Glucose (dextrose, C6 H12 O6).

Resistance to corrosion:

With parts plated twenty minutes at five amperes per square foot, we may safely expect a minimum resistance to the action of the salt spray of 200 hours.

Control:

Chemical, Blum and Hogaboom publish directions for analysis of tin solutions which are easily carried out; samples of the solution are treated with hydrochloric acid and evaporated to expel the cyanides. The tin is then precipitated with hydrogen sulphide, and determined by ignition to stannic oxide, or by solution, reduction and titration with iodine solution.

Summary:

The following is a summary of the qualities of the stannate chloride of tin solution which makes it exceptionally good for heavy deposits:

Simple formula,
Low cost to make,
Low cost for upkeep,
Deposits rapidly,
Gives smooth deposits to any desired thickness,
No sponginess or treeing,
Maintains natural silver gray color of deposit,
Good throwing power,
Easy to control,
Highly resistant to corrosion.

Walter Fraine.

TORONTO BRANCH

At our June meeting motion was made and unanimously passed that Toronto Branch dispense with July and August meetings. Next meeting fourth Monday of September.

PLATING AUTOMOBILE PARTS FOR SERVICE

By Edward W. T. Faint

The title is quite clear I am sure, but that there may be no misunderstanding we will restate it—Plating Automobile Parts for Service.

Service in the sense meant by the title means exposed auto-parts that are plated with nickel and that will stay plated and give reasonable service.

What may be said is not by the way of criticism, but that during our discussion of the subject that better methods than those now in general practice will be suggested, and result in decided improvement over what we now find on our standard finished jobs.

At present we are using the following methods:

Steel Parts

All steel parts are given a first-class polish in the usual way.

The parts are then cleaned by the use of boiling potash.

Electric cleaner (using the double throw switch).

Hydrochloric acid dip.

Water rinse.

Sodium cyanide dip.

Scouring when necessary.

Again thoroughly rinsed in cold water.

Plated in copper cyanide bath for 15 minutes.

Copper Solution (Cyanide)

Water	H_2O	1 gallon
Copper Cyanide	$Cu(Cn)_2$	3 ounces
Sodium Cyanide	NaCn	4 "
Sodium Carbonate	Na_2Co_3	2 "
Sodium Thiosulfate	$Na_2S_2O_3.5H_2O$	1/16 "
Temperature	140° F.	

After being plated 15 minutes in the copper-cyanide bath the parts are removed, rinsed in cold water and transferred to acid copper solution.

Copper Solution (Acid Sulfate)

Water	H_2O	1 gallon
Copper Sulfate	$CuSO_4.5H_2O$	25 ounces
Sulphuric Acid C.P.	H_2SO_4	7 "
Temperature	70°F.	

Average time for copper plating in the acid bath 30 minutes. Work removed from acid bath is thoroughly rinsed in cold water and dried by the use of *boiling water.*

Most all the parts can be copper-plated by the process outlined above, with the exception of some parts that have delicate edges or sharp points, or even fine threads on screws, bolts or nuts, these parts are plated in the copper-cyanide bath only, and given a longer time in that bath.

After copper-plating all parts are buffed, inspected and only the perfect parts returned to the plating room to be nickel plated.

Nickel Plating

The parts having been copper buffed or colored, they are cleaned as previously described in preparation of the work for copper plating and placed in the nickel bath for 60 minutes.

Nickel Solution

Water	H_2O	1 gallon
Nickel Ammonium	$NiSO_4.(NH_4)_2SO_4.6H_2O$	8 ounces
Sulfate	$NiSO_4.\ 7H_2O$	4 "
Nickel Sulfate	$NH_4CL.$	2 "
Ammonium Chloride	H_3BO_3	3 "
Boric Acid	$NiCL_2.\ 6H_2O$	1 "
Nickel Chloride	NaF.	1 "
Sodium Fluoride	80°F.	
Temperature		

The parts receive a smooth adherent close grained deposit of nickel in the above bath.

All parts after nickel plating are rinsed in cold water, heated in boiling water and dried.

Very careful attention is given to the final coloring after nickel plating, and then each piece is given a rigid inspection.

No claim is made for any originality in our methods, and furthermore we are certain that it is not a cheap method, yet as stated before by the use of this method fairly good service has been obtained.

A free discussion is invited—as what we are looking for is the best looking and most durable finish on all auto parts.

Edward W. T. Faint.

MILWAUKEE BRANCH NEWS

Mr. Cal Crumpton and wife were injured in an auto accident. Both were in the Illinois Masonic Hospital at Chicago, Ill.

THE CLEANING AND PREPARING METALS FOR ENAMEL

By Jacob Hay

The purpose of this paper is to discuss the methods of preparing metals for enamel, and to explain some of the causes of poor finish.

It is not the writer's idea to convey the thought that there is anything mysterious or exceedingly difficult in the cleaning of metal, however, there are a great many angles to the process not evident to the layman, and it is necessary to success that one have a great deal of experience, or that he profits by the experience of others.

The following method of preparing steel has been followed by the writer and found very successful:

Pickle in hot nitro cake solution, rinse in cold water, electro clean using reverse current (that is make the part to be cleaned the anode, and the tank the cathode) in the following solution vs:

"	Caustic soda, 4 oz.	per gal. of water
"	Trisodium phosphate, 4 oz.	
"	Carbonate of soda, 3 oz.	
	Silicate of soda, ½ oz.	
	Soap chips, ⅛ oz.	

After the electro cleaning, the parts are delivered by conveyor through a clear water rinse followed by a spray bath to remove all trace of cleaning compounds, thence through a gas heated oven. The heat in this gas oven is intense, and thoroughly dries. It might be well to state, that from this point on it is necessary for all who handle the parts to wear canvas gloves, and not be allowed to handle parts with bare hands. The parts are now ready for inspection.

In the manufacture of certain steel shells as is sometimes necessary to anneal the metal in order to perform difficult draws, this puts a different proposition up to the cleaning department. Such shells have been handled by the writer in the following manner:

As we all know, annealing opens the surface of the metal causing a decided roughness. Such shell should be polished to the desired surface, and backed before the enamel is applied to the same degree of heat as is used when baking enamel; by so doing all foreign matter which might be deposited in the open grain of the metal will come to the surface, and can be easily removed in the cleaning process.

Preparing Brass for Enamel

Brass shells should always be nickel plated before enameling for various reasons, the more important as follows: Long life of the enamel and much better surface. Sheet brass having passed through several press operations has defects such as small cracks and flaws hardly visible to the eye. If enamel is applied to the brass direct all of the flaws show and parts are rejected. Plating the parts and heating to 300° F. before enamel is applied works wonders toward success.

To prepare aluminum die castings for enamel the following method will be found very satisfactory:

Clean in Electro Cleaner strong with caustic soda, rinse in cold water, follow with a dip consisting of:

3 parts nitric acid
1 part sulphuric acid } Rinse

in cold and hot water, this heat of 400° F., dust with air brush. The parts are then ready for enamel.

Die castings of zinc base should be nickel plated before enameling. The method of cleaning die castings for nickel plate is common knowledge and need not be discussed at this time. However, it is necessary to heat castings to 300° F., before applying enamel, this being done to eliminate the possibility of the finished work showing small crater like formations indicating pores in the metal which cause air bubbles in under enamel.

The enameling of zinc or zinc plated castings is in itself a very difficult problem. The writer has had considerable experience in handling such work, and has been quite successful.

The method of handling zinc castings varies somewhat as to the shape and size of the castings, if not too large and irregular in shape they should be polished. The polishing being more economical than to apply several coats of enamel endeavoring to cover the roughness of the casting. Castings zinc coated by dipping present more difficulty in handling than those coated by electro plating. The following method and formula if followed will be found to give good results in handling zinc or zinc coated castings:

Clean in weak alkaline cleaner, rinse in cold water, then dip in a solution of the following:

1 part copper chloride
1 part copper sulphate
1 part ammonia chloride
64 parts of water
1 part of muriatic acid

When removed from solution parts present a grayish color and a surface ready for enamel. It will be found that the enamel will not chip and will retain its lustre.

At times it is required that certain parts be finished in both nickel and enamel. The shape of such parts must be considered when furnishing, it is very often possible to use a shell of some sort to cover the nickel when enamel is applied, but if not possible the nickel parts can be cleaned and the bright surface restored in the following manner:

Nickel color sections to be bright useing felt wheel, using care that the surface to be enameled be not touched by the wheel, then spray entire surface of part, then wipe colored surface using a felt block. By so doing the major part of enamel is removed and very little labor will be necessary to thoroughly clean after baking. The felt block used in this operation must be kept moist with gasoline and from time to time cleaned of surplus enamel.

After everything possible has been done to prepare parts, whatever they may be, for the enameling, and a perfectly clean surface obtained, it is reasonable to believe that very fine finished article should result, but such is not always true. Enamels or japans are by no means 100 per cent. It may be the enamel used has not been prepared with enough thought given to the conditions under which it is to be used, such as heat, length of bake, whether heat be steam, gas or electric. If paints are not prepared from study given to all angles governing the handling of the work, a good product is impossible.

Japan contains linseed, china wood perrella, fish and soybean oils, all used to either lengthen or shorten time of bake and add elasticity and life. It is necessary to use oxidyzing agents in various quantities. These, however, do not stop action when paint is dry, but continue after the hardening of enamel or japan. The japans that contain an excess of a drying agent deteriorate quickly, whereas, if the proper balance is maintained, a brittleness will not result. Brittleness is, perhaps, the most serious of all enamel troubles. Often an article sprayed shows a mottled effect, caused by enamel not flowing properly. The principal difference between a spraying enamel and one prepared for a dip is in the flow. Spraying enamel should be of such a nature that when applied to the parts that it has only flow enough to give an even surface; while dipping enamel must be light enough to drain and at the same time have equal covering quality.

The point of flow is the problem for the enamel maker, he must determine by considering the nature of the articles to be covered and under what drying or baking conditions he must work.

If Japan is over baked brittleness will result, to explain, the application of heat to japan or the baking process causes evaporation of the volatiles and oxidation of the oils. In air drying paints, and varnishes and japans this oxidation takes place at normal temperatures, because they contain driers (oxidyzing agents) incorporated in them. If such materials were added in excess of the required amounts, or the enamels loaded, the result would be a brittlenss in the finished article, caused by the continued action of the driers after the drying attacking the life of the oils. Since heat takes the place of driers in baking, care must be used in this operation as excessive heat will have the same action as an overdose of driers. A japan made to bake at 250° F. contains a larger amount of drier than one mixed to bake at 400°. You will readily see if a piece of goods is mixed to bake at 250° F. is subjected to a temperature of 400° that the result will be brittle enamel. The above statements can be modified somewhat, however, and the effect of driers can be regulated by the amounts and kinds of oil used. There are in particular two kinds of oils used drying and non-drying each kind having good durability. The drying oils do not require the same amount of oxidyzing agents as the non-drying. A proper balance of all ingredients of the enamel together with proper baking conditions is the only solution of the paint shop.

Japan does not adhere to brass, as well as steel. Brass has a greasy surface and oxidizes readily and is a poor surface for enameling. Paint experts claim that the high conductivity of brass causes the brittleness of enamel, although there are enamels that will adhere to brass very well it is in most cases better to nickel plate and be be more certain of results. Proper preparation and cleaning of parts must be ever in mind, the very best materials are wasted on parts that have not been cleaned thoroughly. Any grease or caustics remaining it will act on the oils causing sponification and subsequent brittleness. I might say that the high baked enamels are usually made of Gilsonite base and are fused or melted with various quantities of oil. Usually linseed, china wood, fish, corrella or soy bean together with certain amounts of drier. First and second costs finishing enamels practically have the same

base, but have pigments incorporated consisting of lamp black, carbon blacks. Most high-grade baking enamels are made from a varnish base into which a color black have been ground to obtain color density and covering properties.

The purpose of this paper as originally intended to discuss cleaning and preparing certain metals for enamel has wandered somewhat from a connected line of thought. However, it is the hope of the writer that the subject as handled would be of help to someone.

Jacob Hay.

NICKEL PLATING IN A COMBINATION MANUFACTURING PLANT AND JOBBING SHOP

By J. Underwood

The work being plated is automotive parts, general jobbing work and brass specialties. All jobbing work (except aluminum and die castings) is boiled in a solution of sodium hydroxide to remove paint, oil, heavy grease, etc., they are then stripped of old nickel by the use of a sulphuric acid strip composed of 80 parts acid and 20 parts water, reverse current and lead anodes.

Parts are then sent to polishers for next operation, after grinding, or buffing as required they are then taken to plater, cleaned in a solution of Wyndotte metal cleaner passed through a hychloric acid 10 per cent solution and placed in plating tank.

Sheet brass goods are taken from spinners and punch presses and dipped and buffed and colored and treated as above.

The bath is a 750-gallon tank, what the original formula was I do not know, but taking control of the solution three months ago it stood as follows: Metal concentration nickel sulphate, 17.8 oz. per gal. Anode corrosion ammonium chloride, .2 oz. per gal., the P. H. stood at 6.2, the solution was giving dark streaky deposits, no analyses were made for magnesium sulphate or sodium sulphate, the P. H. was brought back to 5.8, magnesium sulphate, 16 oz. per gal., was added for throwing power. Ammonium chloride, 85 lbs., was added for anode corrosion to bring it up to 2 oz. per gal., which caused some of the nickel sulphate to percipitate out on the anodes and sides of tank. Analyses were again made for $NiSO_4$, which was found to stand at 17.6 ounces per gallon. The anodes were then removed from the tank and cleaned, they showed no

signs of corrosion although they had been in the tank for over one year and six months, they were then pickeled in a H_2SO_4 solution for one and a half hours, cleaned and returned to the tank. Plating was then tried and the solution was found to give a hard brittle pitted deposit. Sodium perborate was then added 1 lb. to every 240 gallons of solution, as recommended by Mr. C. Proctor. Plating was again tried and solution gave a soft pearly white deposit at 2½ volts pressure and current density of 12 amps. per sq. ft., temp. 60 deg. F. Brass parts are plated for 20 minutes, steel and iron from 30 to 45 minutes depending on requirements and type of work.

Tests were then made for maleabilty on pieces of brass, 1/16-2-4 in. the tests were plated for one hour and withstood bending, hammering and showed no signs of parting from the base metal. The solution is maintained at the standard outlined above by small addition of $NiSO_4$ to replace that removed by chemical means, and NHCl is added in amounts of .1 to .2 ounces per gal. as needed, analyses are made twice weekly for metal and chloride and the P. H. is kept at 5.8 by the use of the La Motte indicator block, and remains fairly constant. No difference was noted in the throwing power of solution after the addition of the sodium perborate.

Philadelphia Branch. Joseph E. Underwood.

SPECIFICATIONS

By W. M. Phillips

Specifications—in the sense that they describe composition, physical properties, and behavior—are of greatest importance to the plater. Composition and physical properties are of importance only when they are known to influence the behavior of materials in use.

Specifications can be applied in two ways: One of them, to the plater when the engineer puts on the blue print, "This piece must stand 48 hours' salt spray." The other use can be made by the plater when he says he will be glad to meet the specification but that he would like to make some of his own affecting the plating and polishing equipment as well as the materials to be used.

The plater who swears a bit when he gets the specifications, is to be sypmpathized with; but, respect is due the plater who decides that he will make his work much better than the specifications call for. In order to do this it is often necessary for him to make a very thorough study of his whole job and of the materials which enter into it. A great deal of emphasis has been put on the best plating formulas and methods in general. It is possible that in the next years we can make further advances by an examination of the materials we are using.

It is a well-known fact that small quantities of some materials have a tremendous effect on the quality of plating. We all remember Dr. Blum's paper on the effect of small additions of glue to nickel-plating solutions.

Only a few years back, the engineer wrote on parts drawings the short remark, "Nickel plate," which covered a multitude of sins and often not much nickel. He now puts on his drawings a specification covering a test on the nickel plating. In the old days, when he was so liberal, the plater was justified in ordering on his requisition, "One barrel of nickel salts." Now, does he not only say whether he wants single or double salts, but may add one of the specifications of the Bureau of Standards; in fact—that is what we should have for every chemical used in the plating department, when and wherever it is practical to do it.

It would seem that every supplier of materials, who takes pride in his products, would welcome such a move on the part of the plater. It must be very discouraging to the man trying to sell a really goad product to have to meet the competition offered by a dishonest manufacturer who loads up his material with cheap substitutes and offers it at a price to catch the unsuspecting purchasing agent.

Specifications, describing what the purchasing agent is supposed to buy, seem to be a logical solution for this difficulty. The work done by the Bureau of Standards has been very good, and what we need is more work of this kind, both by the bureau and by platers in general.

Two pictures come to my mind, and they—combined with George Hogaboom—were probably the cause of my writing this paper. Both happened within a short time of each other.

After some years of work on a plating process, we were attempting to put it into production, and it did start off beautifully. So much so, that we decided on a much larger unit. Improved equipment was ordered and installed; solutions carefully made up; and finally, the day arrived to try it out. Officials of the organization were present, and the work put into the tank as usual. All the motions were gone through in apparently fine shape, but when the work was taken out, nothing had happened. It had no more plate on it than it had when it went in. It took two months of hard work to find out that one of our chemicals had contained impurities which made the operation of this bath impossible. The other instance is that of a plant which had spent years in obtaining a low price on Emery Cake—and they surely did succeed in this particular. They had the lowest price on record. But, when the "Emery Cake" was analyzed, it contained no Emery.

Now, please do not get the impression that it is practical to state the composition and physical properties of everything we use in the plating room, or that you could get any Chemist to check up every article which is purchased. However, a study of each item will reveal properties in most of these articles which can be specified, and will result in the more intelligent purchase of materials.

The honesty and cooperation of the suppliers are of greatest importance, and by working together the plater and his supplier of materials can probably do as much in the next five years to improve the quality of plating, as has been done in the past five years. And, I believe that that is saying a lot.

W. M. Phillips.

PRODUCTION

Nickel Plating Conveyors vs. Still Tanks

By Edwin R. Clark

During my twelve years' experience with Warren Webster and Company, Camden, N. J., manufacturers of high grade Steam Traps and Valves, the nickel plating department was equipped with four 300-gallon still tanks, using the old method of stringing of the work on racks, and hanging them in cleaning compound for a few minutes before nickel plating. Then after the work has

been plated for from ¾ to 1 hour, the work is dipped in cold and hot water, then blown with compressed air; the work was then nickel buffed.

During the Summer and Fall of the 1922-1923 season it was necessary to send 50% of the work out to job plating shops, as it was impossible to take care of all the work, even though we were working 3 nights per week overtime, from 6.00 to 9.00 P.M. I had 7 polishers and 7 helpers in the plating room.

In 1924 the new plant was ready and equipped with two 14-feet conveyor plating tanks, and only use the two tanks when plating cast iron work, as we give the iron work 25 minutes deposit, and all brass is only plated 15 minutes, and requires no nickel buffing.

The one tank takes care of all brass work from eight polishers and four helpers in the plating department; the work as it comes from the polishing department is put in baskets and into a Crescent washing machine from 2 to 5 minutes,—long enough to put the work on hooks, then into the nickel tank, which takes 15 minutes to make the circuit; it is then cold and hot watered, then blown off with compressed air.

Work is then ready for the Assembling Department.

RESEARCH COMMITTEE NEWS

Since the list of contributors to Research Fund was published in the Brass World and Metal Industry, the following firms have contributed to this fund:

Hickok Manufacturing Co., Rochester, N. Y.

C. G. Conn, Ltd., Elkhart, Ind.

Charles F. L'Hommedieu & Sons Co., Chicago, Ill.

Chandeysson Electric, St. Louis, Mo.

Mueller Co., Decatur, Ill.

The Editor takes pleasure in this acknowledgment on behalf of the entire American Electro-Platers Society and the Research Committee of 1925-1926.

F. J. Hanlon, Chairman.
R. J. O'Connor.
C. E. VanDerau.

HE WAS TIRED

———Dr. Arthur J. Burton, of Kansas City, one of the Anti-Saloon league leaders, said on his recent visit to Washington:

"'The man who believes from any straw vote that our country is wet at heart—well, that man sees no straighter than Lush.

"'Lush, in the old wet days, came home late one night and began to growl and swear and snarl in a terrible way in the hall downstairs.

"'What's the matter, love?" his wife called from her bedroom.

"'Mather ish,' growled Lush, 'there's two hat-racks here, and I dunno—hic—which one t' hang m' hat on.'

"'But you've got two hats, haven't you?' called Mrs. Lush. 'Hang one on each rack and come up to bed. You're tired, dear.'"

BRANCH NEWS

NEW YORK BRANCH

The July meetings of the New York Branch A. E. S. were held at the World Building, Park Row, New York, and were well attended. The following officers were installed for the ensuing year.

Franklin MacStocker, president; Arthur Grinham, vice-president; John E. Sterlings, secretary-treasurer; Ralph J. Lignori, recording secretary; Richard Quinn, librarian; Herman Ruhlman, sergeant at arms; Benjamin Nadel, assistant sergeant at arms. Trustees: Adolph Stremel, Thomas A. Gardner and John Flanagan.

The branch decided to meet as usual throughout the summer. A committee headed by Mr. Voss is working on arrangements for the annual shore dinner which will be held early in September.

DETROIT BRANCH

Regular meeting of the Detroit Branch was held Friday, July 9-26, with a small attendance. J. Flanagan, presiding.

The application of William A. Pearce and Percy L. Stapleton were reported favorable.

Mr. James E. Fritts' application was rejected, not qualifying.

Ed. Lovering, chairman of the delegates to the convention, read his report which was accepted with a rousing vote of thanks and to cap the climax a substantial check was presented him to help defray his expenses—however he has all the earmarks of all the great artists, he had to be coaxed to take it.

Future delegates take notice the reward will be given only those delegates presenting a written report of all the proceedings of the convention.

Messrs. R. L. Shepherd, Wm. Phillips and B. Lewis were appointed a finance committee to interview and bring before the manufacturers of Michigan the objects of the research fund of the Bureau of Standards. A round-table talk on the usual plating problems was indulged in by all.

Mr. B. Lewis will speak on getting the P. H. values, using the Drop-Ratio method at the next educational meeting July 23-26.

DAYTON, OHIO, BRANCH

Meeting was held at the Y. M. C. A. and a fair attendance. After the regular routine of business Mr. Fraine gave a very interesting and

instructive report on the national convention. He also read a paper on Tin Plating which was very much appreciated and a lively discussion followed. A rising vote of thanks was extended.

Through an invitation of Mr. Van Deran and the Westenhouse Electric Products Co., there will be a get together meeting composed of Cleveland, Toledo, Cincinnati and Dayton branches on September 4, 1927, at Mansfield Ohio, for the inspection of the Westenhouse plant. This is a very good and instructive visit for anyone interested in large production. A committee was appointed for Dayton branch of Mr. Fraine, Mr. Hohman and Mr. Suman. Meeting was adjourned at a late hour.

DETROIT BRANCH

The regular meeting was held at the Detroit Testing Laboratory August 6th with a fair attendance, President J. F. Flanagan presiding. The weather being quite warm, most of the boys spent the evenings across the river in Canada, sipping cool 4 + 4 per cent lager. That accounts somewhat for our small attendance.

Our finance and advisory committee who are soliciting the manufacturers of Michigan in the interests of the research fund of the Bureau of Standards are not receiving much encouragement, they seem to be very cool towards this fund.

Under the good of the order the following were brought out:

Modern zinc die castings consist of zinc, 95 per cent; copper, 5 per cent, and aluminum, 5 per cent, and some also use zinc, 90-95 per cent and the balance lead.

One member had trouble nickeling brass screws. Some batches plated without any trouble and others turned dark, and when plated the deposit would disappear after a few days, bright dipping and tumbling did not help this condition. He overcame this difficulty by dip-silvering the screws before nickeling.

After adjournment to the cool night air, it was discovered that some car thief had appropriated Ed. Lovering's motormeter. A collection was started but Ed. would not stand for it, as he did not spend all of the $25.00 he received as a delegate.

CHICAGO BRANCH

Regular monthly meeting Chicago Branch, A. E. S., held Aug. 14th, 1926, at the Atlantic Hotel.

The meeting was called to order with President Jacob Hay presiding and all officers present.

Seven applications for membership were read and one elected.

Following the question box session our librarian, Mr. O. E. Servis, called upon Mr. Erwin Sohn, who spoke on the subject of the evening—Zinc Solutions—after which he answered all questions asked. This caused some lively discussion in which most members present took a part. Mr. Sohn was given a good hand for his splendid talk.

INDIANAPOLIS BRANCH

Indianapolis Branch held its regular meeting August 14th, presided over by President Hennessey.

One member was reinstated.

The report of our proxy at the Newark convention (F. J. Hanlon) was read and heartily approved by the branch.

A lively discussion on pitting of nickel was had and as we were fortunate enough to have Mr. Walter Donnelly visiting us (who livened up the discussion with his timely remarks), the evening was nicely spent.

CHICAGO BRANCH

Regular monthly meeting Chicago Branch A. E. S. held July 10, 1926, at the Atlantic Hotel.

The meeting was called to order with Pres. Jacob Hay presiding and all officers present. There was a very large attendance.

Two applicants were elected to active membership.

Delegate F. J. Hanlon read the delegate's report on the Newark, N. J., Convention. The same was a very detailed report and was well received.

Mr. R. J. Hazucha had with him the loving cup which was won by Chicago Branch in the membership drive contest. Chicago Branch is very proud to be the owner of this cup.

Mr. Erwin Sohn, who is our acting Librarian, spoke on the papers which were read at the Convention, explaining the same as near as possible without the aid of curve plots, etc. Mr. Sohn's talk was very well received.

The balance of the meeting was given over to our librarian, Mr. O. E. Servis, who found the following questions in the question box:

CHICAGO BRANCH QUESTION BOX

Chicago Branch Question Box

Question: Is it advisable to line load tank which is to be used for a silver solution?

Answer: Yes.

Question No. 2: What is a good formula for an oxidizing agent for gold-plated work?

Answer: Black Nickel solution which contains a small amount of copper was recommended. Another member suggested giving the work a light coat of copper and then oxidizing.

Question No. 3: How do you make Chloride of Tin and what is it solvent in?

Answer: Block Tin should be first melted, poured in cold water and cut down with Muriatic Acid. It was also suggested that the Chloride could be bought cheaper than one could make it themselves.

Question No. 4: In plating aluminum, there is an acid dip used. What is it?

Answer: After cleaning aluminum work, it is dipped in an acid dip consisting of two parts Nitric Acid, one part Sulphuric Acid with one to three ounces Chloride of Iron per gallon.

Question No. 5: Wanted—a formula for a good black direct on sheet Bronze. Must be cheap.

Answer: A dip consisting of Antimony—Sulphide, three ounces Caustic Soda, six ounces, and water one gallon. Another member suggested Muriatic Acid, one gallon; Arsenic, one pound, and Iron Chloride, two ounces.

PHILADELPHIA BRANCH

Philadelphia Branch met on July 9th with a small attendance owing to very hot weather. Mr. H. E. Pike gave an interesting talk on Automatic Plating Machines which was much appreciated by those present.

No meeting will be held in August.

NEWARK BRANCH

Newark Branch held its regular meeting on Friday evening, July 16th, with President Geo. Ouksen in the chair, and 18 members present.

Mr. Augustus H. Dulje was reinstated to active membership.

Mr. Urban A. Mullin was elected to associate membership. A motion was made, seconded and carried that Newark Branch contribute $150.00 to the A. E. S. research fund for research at the U. S. Bureau of Standards.

Final report of the convention committee could not be made as checks for tickets, exhibit space and advertisements were not all in up to date.

That the Newark Convention was a success and the best in the history of the society's 17 years of existence, is shown by the attendance of 946 persons and seated at the banquet tables on the evening of July 1st, which proves that "Newark Knows How."

Under "Reading and Discussions of Papers," President Ouksen called upon Mr. George B. Hogaboom for a talk, whereupon Mr. Hogaboom gave an exceedingly interesting and instructive talk upon the "Deposition of Chromium," revealing many obstacles which the plater will encounter and how to overcome the same. Many excellent points were brought out in his talk and those members who failed to attend the meeting missed a rare treat.

Our August 6th meeting was very well attended, twenty-one members and one visitor from Milwaukee Branch being present. President G. W. Onksen occupied the chair. Chairmen of the various committees on Convention and Banquet made partial reports as there is money still to come in for advertisement space, both space and banquet tickets.

Mr. S. Taylor spoke on the formation of a class for the study of qualitative analysis of solutions at the vocational school this winter.

Application of Mr. Chas. B. Lee, Chattanooga, Tenn., has been received and turned over to the board of trustees to take the usual course.

Discussions on the elimination of carbonates from brass and copper solutions, recovery of gold from a gold stripping solution and the taking of fire out of silver occupied the balance of the meeting when adjournment took place at 10:15 p. m.

ELECTIONS TO MEMBERSHIP

APPLICATIONS

John A. Hanley (Associate).....Detroit Branch
H. E. Button (Active).....Cleveland Branch
Chas. Lee (Active).....Cleveland Branch
Christian S. Sorenson (Associate).....Cleveland Branch

CHICAGO BRANCH

Mathew Butzen, Jr. (Active).....Ideal Metal Works, Chicago, Ill.
Jas. W. Murphy (Associate).....3431 N. Harding Ave., Chicago, Ill.
Ralph Arnold (Active).....1039 N. LaSalle St., Chicago, Ill.
Frank Wrzalla (Active).....1014 W. Monroe St., Chicago, Ill.
W. H. Wilkins (Active).....1160 W. Cerro Gordo St., Decatur, Ill.
Wm. Hink (Associate).....5615 N. Artesian Ave., Chicago, Ill.
Joseph Cosgrove (Active).....735 Grand Blvd., Brookfield, Ill.

REINSTATEMENTS

Arthur Sutchliffe.....Detroit Branch

SUSPENSIONS

CHICAGO BRANCH

William Stoffer.....2042 N. Tripp Ave., Chicago, Ill.
Leo Schmidt.....1732 Girard St., Chicago, Ill.

REJECTIONS

John A. Maguire.....Detroit Branch

TRANSFER

Nicholas D. Cesare.....From Chicago to Milwaukee Branch

CHICAGO QUESTION BOX

Q.1. Why is peroxide of hydrogen used in nickel solution?
A.1. Same was claimed to stop pitting.
Q.2. How much free cyanide for a good throwing silver solution such as hollow ware plating with 4-ounce silver per gallon?
A.2. It was suggested that the cyanide content for this class of work be kept low.
Q.3. Should anodes equal cathode surface in same solution?
A.3. That depends entirely on current density used.
Q.4. What do you think of duozine anodes and cyanobrite?
A.4. No answer to this question as the same were patented.
Q.5. Wanted method of plating aluminum parts, so that silver can be deposited and finished in satin finish?
A.5. It was suggested to nickel plate parts followed by a heavy acid copper deposit, then silver plate and finish. It was doubtful as to whether the same could be done on a commercial scale successfully.
Q.6. What is a pewter finish and how is it obtained?
A.6. Zinc plate parts then dip in a dip consisting of sugar of lead, caustic soda, and cyanide. One member suggested trying a floubrate of lead solution.
Q.8. What thickness of zinc on steel is necessary to stand 2 dips and 3 dips?
A.8. It was taken for granted that the writer meant the copper sulphate test.

3 test—.001 in.—½ oz. per sq. ft.
2 test—1/6 oz. per sq. ft.
1 test—1/3 oz. per sq. ft. zinc deposited.

BOSTON

Regular meetings are held first Friday of each month, at 8 p. m., at the Boston Platers' Supply Co., 202 Friend St., Boston. Secretary, A. W. Garrett, 89 Alexander St., Dorchester, Mass.

BRIDGEPORT

Meets first and third Friday of each month at 62 Cannon St., Room 17, Bridgeport, Conn. Secretary R. J. O'Connor, 1228 Noble Ave., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., Atlantic Hotel, 316 S. Clark St. Secretary, Robt. Meyers, 2432 Wilson Ave., Chicago, Ill.

CINCINNATI

Meets every Thursday, 7:30 p. m., at Vocational Training School, Spring and Liberty St. Secretary, W. J. Husing, 729 McMakin Ave., Cincinnati, Ohio.

CLEVELAND

Meets first Saturday of each month at Hotel Winton. Secretary, N. E. Zadowski, 1433 W. 77th St.

HARTFORD-CONN. VALLEY

Meets in Springfield on alternate months. The Hartford meetings are held at the Hartford Engineers' Club, 12 Haynes St., and the Springfield meetings are held at the Springfield Chamber of Commerce, Broadway and Worthington St., Springfield. Tennant Elwin, Secretary, 117 Hobart St., Meriden, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Albert Bates, Box 34, Vandalia, Ohio.

DETROIT

Meets the first and third Friday of each month at the Detroit Testing Laboratory, 554 Bagley Ave., Detroit. Secretary, Geo. Kutxen, 1087 W. State Fair Ave., Detroit, Mich.

GRAND RAPIDS

Meets on the second Wednesday of each month at the Vocational High School, 129 Bostwick Ave., N. E. Secretary, John Raven, 1139 Emerald Ave., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1725 Union St., Indianapolis, Ind.

MILWAUKEE

Meets second and fourth Thursdays of each month at Lipps Hall, 321 3d St. Secretary, Ed Werner, 527 3rd St., Milwaukee, Wis.

MONTREAL

Meets every Friday at 84 Craig St. West. Secretary, John H. Feelay, 411 Aylmer St., Quebec, Canada.

NEWARK

Meets first and third Fridays of each month at Hotel St. Francis, 22-24 E. Park St., Newark, N. J., at 8 p. m. Secretary-Treasurer, Royal F. Clark, 55 Seymour Ave., Newark, N. J.

NEW YORK

Meets every second and fourth Fridays of each month in the World Building, Park Row, New York City, N. Y. Secretary, J. E. Sterling, 2595 45th St., Astoria, L. I.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Saturday of each month at 8 p. m., at United States Bureau of Mines Bldg., Forbes St. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 184 Washington St., Room 308, Providence, R. I. Secretary, Robert Crook, 185 County St., Attleboro, Mass.

ROCHESTER

Meets every second and fourth Saturday of each month at the Powers Hotel. C. A. Reama, Secretary, 512 Lyell Ave., Rochester, N. Y.

ST. LOUIS

Meets first Tuesday of each month at Barr Branch Library, corner Jefferson and Lafayette Sts. Secretary, F. P. Menniges, 3205 A Arsenal St., St. Louis.

TOLEDO

Meets first Thursday of each month at Toledo University Science Building, Electro-Platers' Room, corner Cherry and Page Sts. Secretary, W. W. Weiker, 411 3d St., Toledo, Ohio.

TORONTO

Meets fourth Monday of each month at Canadian Foresters' Hall, 22 College St., Room No. 2. J. C. Cairns, 10 Wilshire Ave., Toronto, Ontario, Canada.

WATERBURY

Meets every second and fourth Friday of each month. Secretary, Wm. F. Guilfoile, 14 Oakland Ave., Waterbury, Conn.